

NATURAL RESOURCES CONSERVATION SERVICE
INTERIM
CONSERVATION PRACTICE STANDARD

RESIDUE MANAGEMENT, DIRECT SEED

(Acre)

CODE 777

DEFINITION

Managing the amount, orientation and distribution of crop and other plant residues on the soil surface year-round, while growing crops in narrow slots, or tilled or residue free strips in soil previously untilled by full-width inversion implements.

PURPOSES

This practice may be applied as part of a conservation management system to support one or more of the following:

- Reduce sheet and rill erosion.
- Reduce wind erosion.
- Maintain or improve soil organic matter content.
- Improve or maintain water infiltration and conserve soil moisture.
- Manage snow to increase plant available moisture or reduce plant damage from freezing or desiccation.
- Provide food and escape cover for wildlife.
- Reduce irrigation induced erosion.
- Improve or maintain water quality.
- Maintain or improve agronomic yields.

CONDITIONS WHERE PRACTICE

APPLIES

This practice applies to all cropland and other land where crops are grown.

This standard includes tillage and planting methods commonly referred to as direct seed, slot plant, row till, zone till, or strip till.

CRITERIA

General Criteria Applicable to All Purposes Named Above

Disturbance caused by seedbed preparation, planting, and fertilizer placement shall be between one third and two thirds of the row width. Reference Agronomy Technical Note 4 for percent soil disturbance values of known seed and fertilizer placement tools.

Loose residues to be retained on the field, shall be uniformly distributed on the soil surface. Where combines or similar machines are used for harvesting, they shall be equipped with spreaders capable of distributing residue over at least 80 percent of the working width of the header.

Planters or drills shall be equipped to plant directly through untilled residue or in a tilled seedbed prepared in a narrow strip along each row by planter attachments such as rotary tillers, sweeps, multiple coulters, or row cleaning devices.

Residues shall not be burned, or disturbed by full-width tillage operations except as follows:

If row cultivation or spot treatment for weeds, leveling ruts, or similar operations become necessary, tillage shall be limited to undercutting (noninversion), operations which minimize burial of surface residue. Burning of crop residues may occur only when infestations levels of pest or disease exceed defined threshold levels for the identified pest. Burning will only be allowed as prescribed in an approved Pest Management Plan on delineated portions of fields where the infestations exist.

Partial removal of grain residue by baling or grazing is allowed on cereal crops (high residue crops) if followed by another high residue crop

Additional Criteria to Reduce Sheet and Rill Erosion

The amount of randomly distributed, flat residue needed to reduce erosion within the soil loss tolerance (T) or any other planned soil loss objective, shall be determined using current approved erosion prediction technology, i.e., Revised Universal Soil Loss Equation (RUSLE). Partial removal of residue by means such as baling or grazing shall be limited to retain the amount needed.

Calculations shall account for the effects of other practices in the conservation management system.

Additional Criteria to Reduce Wind Erosion

The amount and orientation of residue needed to reduce erosion within the soil loss tolerance (T) or other planned soil loss objective shall be determined using current approved wind erosion prediction technology, i.e., Wind Erosion Equation (WEQ). Partial removal of residue by

means such as baling or grazing shall be limited to retain the amount needed.

Calculations shall account for the effects of other practices in the conservation management system.

Additional Criteria to Reduce irrigation induced erosion

The erosion reduction effectiveness of planned practices shall be determined using current approved furrow erosion prediction technology, Surface Irrigation Soil Loss Model (SISL). Planned or applied systems shall be within the soil loss tolerance (T) or other planned soil loss objective. Partial removal of residue by means such as baling or grazing shall be limited to retain the amount needed to maintain a positive soil conditioning index.

Calculations shall account for the effects of other practices in the conservation management system.

Additional Criteria to Maintain or Improve Soil Organic Matter Content

The amount of residue needed to achieve the desired soil condition, shall be determined using the current approved soil conditioning index procedure, i.e.: Soil Conditioning Index. Partial removal of residue by means such as baling or grazing shall be limited to retain the amount needed. Calculations shall account for the effects of other practices in the conservation management system.

Additional Criteria to Conserve Soil Moisture

A minimum quantity of 50 percent residue cover shall be maintained throughout the year. Residue shall be evenly distributed and maintained on the soil surface. Partial removal of residue by means such as baling or grazing shall be limited to retain the amount needed.

Additional Criteria to Manage Snow to Increase Plant Available Moisture or Reduce Plant Damage From Freezing or Desiccation

Stubble shall be left standing as high as possible by the harvesting operation, but not less than 6 inches in any case. Stubble shall remain standing over winter to trap and retain snow. Loose residue may be removed providing that the remaining residue is left standing.

Additional Criteria to Provide Food and Escape Cover for Wildlife

Residue height, amount, and time period shall be determined using an approved habitat evaluation procedure. Residues shall not be removed unless it is determined by the Wildlife habitat Evaluation Guide.

CONSIDERATIONS

Individual conservation practices should be planned as part of a comprehensive conservation plan which addresses all resource concerns on the unit being planned and reaches a Resource Management System (RMS), level of treatment. Consideration may have to be made for programs that do not require RMS plans.

Direct seeding may be practiced continuously throughout the crop sequence, or may be managed as part of a system, which includes other tillage and planting methods such as mulch till. Selection of acceptable tillage methods for specific site conditions may be aided by an approved Soil Tillage Suitability Rating.

Production of adequate amounts of crop residues necessary for the proper functioning of this practice can be enhanced by selection of high residue producing crops and crop varieties in the rotation, use of cover crops, and adjustment of plant populations and row spacings.

Maintaining a continuous direct seed system will maximize the improvement of soil organic matter content. Also, when direct seeding is practiced continuously, soil reconsolidation provides additional resistance to sheet and rill erosion.

The effectiveness of stubble to trap snows or reduce plant damage from freezing or desiccation increases with stubble height. Variable height stubble patterns may be created to further increase snow storage.

Leaving rows of unharvested crop standing at intervals across the field can enhance the value of residues for wildlife habitat.

PLANS AND SPECIFICATIONS

Specifications for establishment and operation of this practice shall be prepared for each field or treatment unit according to the Criteria, Considerations, and Operation and Maintenance described in this standard. Specifications shall be recorded using approved specification-sheets, job sheets, narrative statements in the conservation plan, or other acceptable documentation.

OPERATION AND MAINTENANCE

No operation and maintenance requirements, national in scope, have been identified for this practice.

REFERENCES

Agronomy Technical note by each state utilizing the disturbance information collected by the Tri-State Natural Resources Team.